SOME NOTES ON THE OCCURRENCE AND SEASONALITY OF *AUSTROMEROPE POULTONI* KILLINGTON (MECOPTERA) IN WESTERN AUSTRALIA

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Abstract

Forty-five individuals of the primitive mecopteran, *Austromerope poultoni*, have recently been collected during systematic sampling near Boddington and Worsley in south-west Western Australia.

The data indicate that the species is probably univoltine with a peak of adult activity in winter and extending into spring. It shows no apparent preference for vegetation association and occurs throughout a wide rainfall range in south-west Western Australia. The sampling programme suggests that the adult spends most of its time on the ground.

Introduction

Austromerope poultoni Killington is a primitive mecopteran belonging to the Meropeidae, a small family known only from North America and south-west Western Australia, and *A. poultoni* is the only known Australian representative (Riek, 1954). The immature stages of *A. poultoni* are unknown.

Until recently, *A. poultoni* was known from only two specimens: the male holotype which was collected near Yallingup (Killington, 1933) and a female which was collected by Dr E. S. Ross at Darlington (Penniket, 1977). In 1974, two females and one male were recorded from near Manjimip, W.A. and in 1976, two adults were taken east of Busselton, W.A. by officers of the W.A. Department of Agriculture (Penniket, 1977).

Worsley Alumina Pty Ltd has recently carried out a base-line biological survey prior to bauxite mining and alumina refining in the Darling Range, W.A. The project areas are near Boddington (32°48′S, 116°28′E) and Worsley (33°19′S, 116°00′E). Invertebrates were sampled in the period March 1980-June 1981 (Phase One Studies) and throughout 1982 (Phase Two Studies). Samples were taken in a systematic manner to facilitate interhabitat comparisions and to provide information on seasonality. *A. poultoni* was collected during both the Phase One and Phase Two studies and the data presented provide information on its habitat preferences, seasonality and sex ratio.

Sampling sites and procedure

The Boddington area (mean annual rainfall approximately 760 mm) comprises a number of vegetation associations surrounded by extensive farmland. In the broadest sense, these may be described as jarrah (*Eucalyptus marginata*) woodland and forest, wandoo (*Eucalyptus wandoo*) woodland and proteaceus heath, often with emergent *Eucalyptus drummondii* (Worsley Alumina Pty Ltd and Dames and Moore, 1981). The Worsley area has a higher annual rainfall of about 1270 mm per year and is dominated by jarrah forest. Yarri (*Eucalyptus patens*) and bullich (*Eucalyptus megacarpa*) forests occur in moister areas adjacent to creeks.

In the 1980-81 Phase One studies 11 Principal Investigation Locations (PIL's) were sampled for invertebrates by systematic light-trapping, pitfall-trapping (5.5 cm diameter jars containing 70% ethanol), foliage sweep-netting and log, rock and bark searching. Locations included all of the representative vegetation associations mentioned above. PIL's were sampled during July, 1980 or during October-November, 1980.

For the 1982 Phase Two studies 14 quadrats were established for invertebrate sampling by the authors: 10 near Boddington and 4 near Worsley. Plots comprised 7 jarrah, 2 wandoo, 3 heath, 1 bullich and 1 yarri habitat. Each of the Boddington quadrats was sampled during each of the major seasons by systematic pitfall trapping (1.8 cm diameter tubes containing 70% ethanol and glycerol), tree-beating and foliage sweep-netting. Twenty samples were taken from each quadrat for each sampling method. The Worsley quadrats were sampled only during autumn and spring.

Results

Three specimens were collected by pitfall-trapping only during the Phase One Studies. These were a female from a heath near Boddington during July, 1980, a male specimen from the same location in October, 1980, and a third (sex unspecified) specimen from jarrah woodland during October 1980.

The results of the Phase Two Studies are shown in Table 1. Only pitfall-trapping yielded specimens. No specimens were collected during

TABLE 1

Numbers of *Austromerope poultoni* sampled by pitfall trapping during the Worsley Alumina's Phase Two biological studies. No individuals were obtained during the mid February (Summer) or late April (Autumn) sampling periods.

Location	Vegetation Association	Sampling Date mid July (Winter)	late Oct. (Spring)
Boddington	jarrah forest	0	0
	jarrah forest	2♂ 10♀	1♀
	jarrah forest	1♀	0
	jarrah forest	4♂ 4♀	0
	jarrah forest	4♂ 3♀	0
	heath	1♀	0
	heath	0	0
	heath	2♂ 7♀	1♀
	wandoo woodland	1♀	0
	wandoo woodland	0	0
Worsley	jarrah forest	*	1♀
	jarrah forest	*	0
	yarri forest	*	0
	bullich forest	*	0
	Total	12♂ 27♀	3♀

* Not sampled at this time.

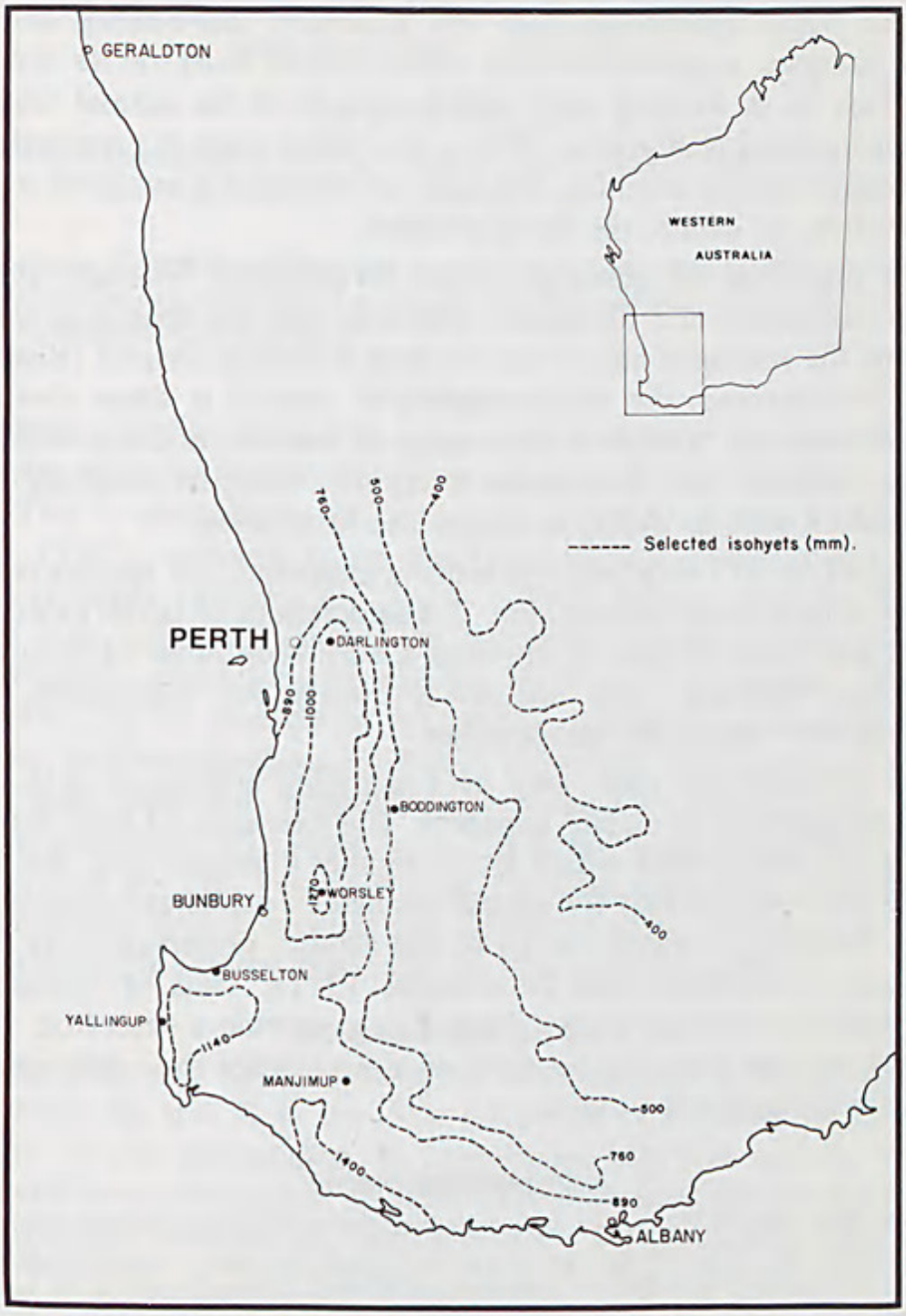

Fig. 1. Map of south-western Western Australia showing selected isohyets and also the known distribution (●) of *Austromerope poultoni.*

summer or autumn, but 39 were collected in winter and 3 in spring. In winter specimens were trapped in all major habitats: jarrah, wandoo and heath. The sex ratio was 1 male: 2.25 female. It is uncertain whether this indicates a real ratio or trappability.

Discussion

The times when specimens were sampled during Worsley Alumina's Phase One and Two studies corresponded closely. The animal appears to have a peak of adult activity during winter, declining through spring. The presence of only one peak indicates that the life cycle is probably univoltine. The

absence of adult specimens from the extensive tree-beating and foliage-sweeping samples suggests that the adult spends most of its time on the ground. This is in keeping with earlier reports of the animal being found under logs or rocks (Killington, 1933). The larval stage is presumably active during summer and/or autumn, although no evidence is available to confirm precisely when, or where, the larva is found.

The recording of specimens from Boddington, Worsley, Darlington, Yallingup, Busselton and Manjimup indicates that this species is widespread throughout the southern half of the Darling Botanical District (Beard, 1980) (Fig. 1). Furthermore, the wide variation of rainfall at these sites indicates that the species can tolerate a wide range of habitat moisture regimes. This might also indicate that the species is cryptic, living in conditions of more stable moisture such as within or below the litter layer.

In addition to being geographically widespread, the species occurs in a wide range of vegetation associations. The associations of jarrah forest, wandoo woodland and heath (Table 1) represent a very wide range of structural and micro-habitat variation. The species is clearly not dependent on plant physiognomy or vegetation composition.

The observed sex ratio may be a sampling artifact. If it is a genuine value, no explanation is readily apparent. The existence of large numbers of this species in pitfall traps which are of smaller diameter than the length of the animal may indicate that the animal has made a deliberate attempt to enter the traps. Possibly, it was attracted to the alcohol preservative, as are many other insects (Greenslade and Greenslade, 1971). Thus, *A. poultoni* may normally feed on material where alcohol may provide a detection cue. Plant nectar may be one such food-source or alternatively the adult animal may feed on a decomposition product.

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References

Beard, J. S., 1980. A new phytogeographic map of Western Australia. *West. Aust. Herb. Res. Notes* 3: 37-58.

Greenslade, P. and Greenslade, P. J. M., 1971. The use of baits and preservatives in pitfall traps. *J. Aust. ent. Soc.* 10: 253-260.

Killington, F. J., 1933. A new genus and species of Meropeidae (Mecoptera) from Australia. *Entomologist's mon. Mag.* 69: 1-4.

Penniket, J. G., 1977. The primitive protomecopteran *Austromerope poultoni*. In: *Western Australian Entomology Workshop. Proceedings of a workshop held at the WA Institute of Technology, Bentley.* Pp. 20-21.

Riek, E. F., 1954. The Australian Mecoptera or scorpionflies. *Aust. J. Zool.* 2: 143-168.

Worsley Alumina Pty Ltd and Dames and Moore, 1981. *Worsley Alumina Project. Flora and Fauna studies. Phase I.* Worsley Alumina Pty Ltd, Perth, 251 pp.